

CHAPTER 1

PURPOSE OF AND NEED FOR ACTION

This chapter describes the proposed action studied in this document, and provides a background history of the project. Evaluation of current and projected traffic demands and the existing and proposed transportation systems within the study area are presented. Social and economic factors which may have an effect on the need for the project are summarized. The chapter concludes with a summary of the need for the project.

1.1 PROJECT STATUS

1.1.1 Project Setting

The City of Shelby is situated along existing US 74 in Cleveland County in southwestern North Carolina. A city of approximately 20,000 residents, it is a moderately dense, low-rise urban area surrounded by the gently rolling countryside typical of the Piedmont. US 74 enters Cleveland County from east of Mooresboro in Rutherford County and continues to Gaston County just west of I-85 near Kings Mountain. US 74 Business traverses the approximate center of Shelby in an east-west orientation; on the west side of Shelby, this route is divided into US 74W Business (West Marion Street) and US 74E Business (West Warren Street). US 74 Business diverges eastward from US 74 approximately 1.6 miles west of the city center and continues eastward and southeastward through the center of Shelby, to rejoin US 74 approximately 3.2 miles east of the city center. The portion of existing US 74 which provides an alternate routing to US 74 Business is commonly referred to by local residents as "the US 74 Bypass" or "the Bypass." Exhibit 1-1 shows the project study area.

Existing US 74 is primarily a four-lane divided highway with partial control of access and limited right-of-way. This highway, particularly the bypass portion, includes commercial strip development containing a variety of busy retail uses and some light industry. It has frontage roads and numerous intersections, driveways, and traffic signals, all of which have contributed to increasingly congested, unsafe conditions as traffic volumes have risen.

1.1.2 Description of the Proposed Action

The proposed action involves improvement of the US 74 corridor in the vicinity of Shelby, from 0.6 mile west of SR 1162 to SR 1001. This improvement may be achieved via several different highway corridors, including a new location freeway bypass of the existing US 74 facility and by an upgrade of the existing US 74 highway to a freeway level facility.

New location alternatives, designated Bypass alternatives, and an Upgrade alternative were established for the proposed action and studied in detail. For planning purposes, both the Bypass alternatives and the Upgrade alternative were corridors at least 1,000 feet wide. Since required right-of-way width for the project is approximately 325 feet, the wider corridors allowed flexibility in the design phase for the avoidance and minimization of impacts to important manmade and natural features.

In addition to the Bypass and Upgrade alternatives, the following options were also examined for their potential to meet the purpose and need and fulfill the transportation, social, economic, and environmental goals of the proposed action:

1. No Build or "do-nothing" alternative
2. Mass Transit alternative
3. Transportation System Management alternative

These alternatives are discussed in greater detail in Chapter 2.

1.1.3 Project History

The concept of a US 74 Bypass of Shelby was first included in the 1979 Thoroughfare Plan for Shelby as a route to the north of the city. In November, 1991, a feasibility study for the US 74 Bypass was prepared by the North Carolina Department of Transportation (NCDOT). This study showed conceptual bypass locations both to the north and south of Shelby, but recommended the southern bypass location.

The 1994 Shelby Thoroughfare Plan was adopted by the City of Shelby on September 6, 1994, and by the North Carolina Department of Transportation on November 4, 1994 (see Exhibit 1-2). This plan included the northern bypass of Shelby based on the greater traffic volumes anticipated to the north of town; and on the input received from Shelby officials in favor of a northern bypass location. Section 1.4.2 includes additional information regarding the 1994 Thoroughfare Plan.

The NCDOT State Transportation Improvement Program - 2007-2013 lists the Shelby Bypass (TIP Project Number R-2707) as a part of the US 74 Intrastate Corridor. The North Carolina Intrastate System is a network of major US and NC highways designated for improvement to multilane arterial facilities by the North Carolina General Assembly. The Intrastate System was established to provide high speed, safe travel service throughout the state and support statewide growth and development goals. The project is also a part of the US 74 Priority Completion Corridor extending from I-26 in Polk County to US 17 in Brunswick County. This corridor is considered to be a key economic development corridor for North Carolina, and will connect

three major North Carolina cities: Asheville (via I-26), Charlotte, and Wilmington (see Section 1.4.2 for additional information on the US 74 Priority Corridor).

The Draft Environmental Impact Statement for Project R-2707 was approved on October 1, 1998.

In the earlier stages of the project (those that predated the NEPA/404 process), coordination with agencies was achieved through several steering committee/interagency meetings. This project was formally included in the Concurrence process at Concurrence Point #3 (CP #3), Selection of Least Environmentally Damaging Alternative; this meeting, which was held on May 5, 1999, resulted in the selection of Alternative 21 as the Preferred Alternative. On January 17, 2001, the Concurrence Point #4 meeting was held, and avoidance and minimization measures were agreed upon (Note: Concurrence Point #4 is now referred to as Concurrence Point #4A).

1.2 SYSTEM LINKAGE

1.2.1 Interstate Routes

Three interstates exist near the study area which are of relevance to the subject section of US 74. I-26 travels in an approximate northwest-southeast orientation to the west of the proposed project; on a regional scale, this interstate extends from US 23 north of Asheville to Charleston, South Carolina. I-77, which is aligned in an approximate north-south direction, traverses Charlotte to the east of the proposed project; on a national scale, this facility serves traffic from Cleveland, Ohio to Columbia, South Carolina. I-85, southwest to northeast in orientation, traverses Charlotte, conjoining with I-77 in the northern portion of the city; over its length, the facility extends from Montgomery, Alabama to I-95 south of Richmond, Virginia, crossing I-26

in Spartanburg, South Carolina. All three of these interstate facilities are multi-lane, divided, controlled access freeways; portions of I-85 and I-77 in and near Charlotte have been widened to six or eight lanes or are scheduled for widening in the future.

1.2.2 US 74 Route

The subject section of US 74 is important both as a link in the North Carolina state highway system and as a local thoroughfare. US 74 has been identified by NCDOT as a key economic development highway for the state; planned improvements to this facility will provide a safer, more efficient transportation system with increased economic, employment, and residential opportunities. The subject project is included in the section of US 74 which connects I-26 with I-85. The improvement of the US 74 corridor through Shelby or the construction of a Shelby bypass, in conjunction with other proposed improvements to US 74 (see Section 1.4.1), will provide a fast, efficient multi-lane route between Asheville and Charlotte which is 15 miles shorter than using the I-26/I-85 routing.

On a local level, the improvement of the US 74 corridor through Shelby is needed to alleviate existing and future traffic congestion. The existing roadway includes strip developments, frontage roads, and a series of traffic signals, all of which contribute to delays and safety problems. Increases in traffic are anticipated on this facility as a result of the recently completed improvements to the section of US 74 between I-26 and Forest City (to the west). Construction of a controlled access freeway facility will provide a safe, efficient route for through traffic; and will improve safety and reduce congestion. Access to an improved transportation system will provide economic benefits to the City of Shelby by improving the transport of goods and services.

1.2.3 NC Routes and Secondary Roads

NC highway routes in and near the study area include:

NC 18 - This facility extends from the Blue Ridge Parkway through Wilkesboro, Lenoir, and Morganton north of Shelby; and continues to Gaffney, South Carolina south of Shelby. In the vicinity of the study area, it travels southward into Shelby (Fallston Road), turns southwesterly (Grover Street), then proceeds southward through the center of town (Lafayette Street).

NC 150 - This highway extends from Salisbury to Gaffney, South Carolina. Within the study area, it approaches the City of Shelby in a southwesterly orientation, continues westward into Shelby (Marion Street, US 74 Business), proceeds south (DeKalb Street) and west (Graham Street), then continues southward concurrent with NC 18 (Lafayette Street). South of Shelby, it diverges from NC 18 in a westerly direction toward Boiling Springs.

NC 180 - This route is localized in the study area. It begins and terminates at NC 18 north and south of Shelby, respectively, and loops east of Shelby in an approximate north-south orientation.

NC 226 - This road extends from south of Johnson City, Tennessee to US 29 in Grover. Within the study area, it travels southward to a junction with US 74 west of Shelby and continues along existing US 74 in a southeasterly orientation. It diverges from US 74 in the southern portion of town and continues southeasterly to a junction with NC 180, which it follows southward. In Patterson Springs, NC 226 diverges from NC 180 in a southeasterly direction towards Grover.

There are numerous secondary routes, both paved and unpaved, criss-crossing the study area, many of which intersect with US 74. These secondary facilities generally provide localized land access for area residents and do not typically carry high volumes of traffic.

1.3 **SOCIAL AND ECONOMIC DEVELOPMENT**

Although the study area is largely rural in nature, there are several municipalities and communities located within the immediate sphere of influence of the project; these include the cities of Shelby and Kings Mountain; the towns of Boiling Springs, Patterson Springs, Lattimore, Earl and Grover; and the communities of the Double Shoals, Washburn and Stubbs. Cities such

as Asheville, Gastonia and Charlotte, which are outside of the project boundaries but utilize US 74 for regional access, are also affected by conditions on the highway facility. Improvement of the US 74 corridor through Shelby would serve a twofold purpose: 1) it would provide benefit to the various groups of users of the US 74 facility (i.e., commercial traffic, school-related traffic, commuter traffic, tourist and other through traffic, emergency vehicles, and local traffic); and 2) it would create regional benefits that could potentially enhance economic conditions in the area municipalities.

1.3.1 User Benefits

Commercial Traffic. Commercial and industrial traffic such as transport trucks would save travel time through the improved highway system. The decreased vehicle delays would result in cost savings for businesses both in terms of labor (faster, safer travel would allow drivers additional time for transportation of goods) and fuel consumption. A significant portion of commercial freight is moved on the nation's highways; trucks transport one-half the weight and nearly 25 percent of the ton-miles of all freight shipments in the United States. The number of commercial trucks on America's highways grew by 76 percent between 1982 and 1992, while the distance traveled doubled. Therefore, it is likely this project would substantially improve freight movement.

School-Related Traffic. School buses and other school-related traffic could benefit from the proposed improvement of the US 74 corridor through a better travel system for some bus routes. The improvements could provide an additional benefit: school-related trips occurring along existing US 74 would no longer have to compete with through traffic; either through traffic would be re-routed to a new bypass facility (in the case of a Build alternative), or school traffic

would have a system of service roads to use (in the case of an Upgrade alternative). A bypass would provide a connection between radial arterials. This would potentially reduce traffic on these arterials which would otherwise compete with school buses and other school-related traffic. Consequently, school bus circulation and safety would improve.

Commuter Traffic. Data from the 2000 Census indicated that approximately 66 percent of inter-county commuters employed in Cleveland County were from Rutherford, Gaston, or Mecklenburg counties; and approximately 67 percent of Cleveland County residents employed in other counties worked in Rutherford, Gaston, or Mecklenburg counties (see Section 3.1.3 Transportation Planning). Since US 74 is a major west-east conveyor of traffic among these four counties, it is reasonable to assume that a substantial proportion of these commuters, as well as some intra-county commuters, use this highway to access employment locations. This group of users would benefit from the improved travel times realized on an improved US 74 facility.

Not only would current commuters save time and money, but employment opportunities could increase for other project area residents as employment centers become more easily accessible. The project area could become increasingly attractive to prospective residents desiring a wide range of accessible amenities.

Tourist Traffic. Tourism for North Carolina would be helped by the proposed action. To the west of the project area, Asheville and the Great Smoky Mountains resort areas are accessed by US 74. Charlotte, to the east, is a center for cultural activities and entertainment. As a part of the section of US 74 connecting these areas, the subject project would make tourist travel faster and safer.

Emergency Vehicles. Emergency services (fire and medical) depend upon quick response times to maximize their effectiveness. The improvements proposed for the subject project would provide faster travel for emergency vehicles. Like the school traffic, emergency services trips would also benefit either because through traffic would be re-routed to a new bypass facility (in the case of a Build alternative), or emergency traffic would have a system of service roads to use (in the case of an Upgrade alternative). The proposed improvements would provide better access to the northern section of the county.

Local Traffic. Local travel (shopping, personal services, and local business) using existing US 74 would benefit from the improvements in a way similar to school and emergency trips.

1.3.2 Regional Benefits

To be competitive in the regional economy, Cleveland County producers must maximize the efficiency of production and distribution. Reducing vehicle delays for commercial and industrial traffic would translate into cost savings in terms of labor and fuel consumption. Improving the US 74 corridor through Shelby would ensure that local businesses and industries would continue to thrive, and perhaps expand to compete with businesses in larger cities such as Charlotte.

Population projections for Cleveland County and the City of Shelby (see Table 1-1) indicate that most anticipated growth in the county would likely be in and near Shelby. Improvements to the transportation network in the vicinity of Shelby would thus provide increased mobility to potential employment opportunities in Shelby and elsewhere and would encourage the growth of businesses near Shelby.

The proposed improvement of the US 74 corridor would provide a boost to the local economy. Short-term employment increases due to construction related jobs could be expected. The improved roadway system would accommodate new and diversified industries due to the improvement in the movement of goods and services through the region.

Table 1-1
AREA POPULATION GROWTH FACTORS

<u>AREA</u>	<u>BASE POPULATION</u>	<u>CURRENT OR PROJECTED POPULATION</u>	<u>POPULATION YEAR RANGE</u>	<u>ANNUALIZED % GROWTH RATE</u>
City of Shelby	14,669	19,477	1990 - 2000	2.9
Cleveland County	84,714	115,247	2000 - 2020	0.9
North Carolina	8,049,313	10,895,220	2000 - 2020	1.5

SOURCES: 1990 U.S. Census, Summary Tape File 1.
2000 U.S. Census Data.
NC Data Center.

Economic benefit would be realized through cost savings from the following:

- 1) Commercial traffic would save money due to improved travel times and increased fuel and labor efficiency. Businesses region-wide relying on the subject section of US 74 for the transportation of goods and services would have lower operating costs, and would be able to pass those savings along to their customers.

- 2) Reduced fuel consumption for individual drivers and services (school and emergency) would lower personal out-of-pocket expenses and decrease county services costs.

1.4 TRANSPORTATION PLANS

1.4.1 Strategic Highway Corridor Plan

The Strategic Highway Corridors (SHC) initiative represents a timely effort to preserve and maximize the mobility and connectivity on a core set of highway corridors, while promoting environmental stewardship through maximizing the use of existing facilities to the extent possible, and fostering economic prosperity through the quick and efficient movement of people and goods. The initiative offers NCDOT and its stakeholders an opportunity to consider a long-term vision when making land use decisions and design and operational decisions on the highway system. The subject section of US 74 is a portion of Corridor 11 identified in this initiative. The Strategic Highway Corridor Plan Vision for this section of US 74 is a freeway.

1.4.2 NCDOT State Transportation Improvement Program - 2007-2013

The proposed project being considered in this study is designated as TIP Project Number R-2707 in the NCDOT State Transportation Improvement Program - 2007-2013 (TIP). This project was included in “Transportation 2001” (the TIP covering the years 1994 to 2001) as a part of what was referred to then as the US 74 Priority Corridor. The purpose of the priority corridor designation was to promote acceleration of the improvement of the US 74 transportation corridor across the state, since this highway is considered to be a key economic development highway for North Carolina. Table 1-2 indicates the four other projects that were included in the US 74

priority corridor. All of these projects are new location facilities; three of the four are bypasses of one or more municipalities (Charlotte and Monroe).

The US 74 Intrastate Corridor includes one nearby highway project, which is important to US 74 and its economic development potential (see Table 1-2).

Table 1-2

OTHER NCDOT STATE TRANSPORTATION IMPROVEMENT PROGRAM (TIP) PROJECTS

TIP #	County	Highway Project Name	Location	Description	Length (Miles)
"Transportation 2001" US 74 Priority Projects					
R-2248†	Mecklenburg	I-485 (Charlotte Western Outer Loop)	West of I-77 to I-85 North	Freeway on new location	28.0
R-211	Mecklenburg	I-485 (Charlotte Southern Outer Loop)	West of I-77 to US 74	Four-lane freeway on new location (note: project complete except for interchange at SR 3468)	16.6
R-2559*†	Union	US 74 (Monroe Bypass)	Around Monroe	Four-lane divided facility on new location	13.6
R-513*†	Robeson	US 74	Maxton Bypass to NC 41	Four-lane divided facility on new location	20.2
US 74 Intrastate Corridor Projects					
U-209B	Mecklenburg	US 74-NC 27 (Independence Blvd.)	NC 24-27 to Idlewild Road	Widen roadway to a multi-lanes with HOV lanes, interchange, and safety improvements	1.4
Cleveland County TIP Projects					
R-4045†	Cleveland	US 74	Mooresboro to Proposed Shelby Bypass	Upgrade to full control of access	1.0
R-2222	Cleveland	Dixon Avenue	US 74 Business west of Shelby to US 74 east of Shelby	Widen to six lanes	5.5
U-2567	Cleveland	----	US 74 / NC 150 (DeKalb Street)	Construct interchange	---
U-2221	Cleveland	NC 180	NC 226 to NC 150	Widen roadway to a multi-lane facility	4.9
Other Projects					
R-3329†	Union/ Mecklenburg	Monroe Bypass-Charlotte Outer Loop Connector	US 74 from Monroe Bypass to Charlotte Outer Loop	Multi-lane divided freeway on new location	11.5

* US 74 Intrastate Corridor Project
 † Strategic Highway Corridor project

Several Cleveland County projects are identified in the 2007-2013 NCDOT TIP which are of importance to the City of Shelby and its environs (see Table 1-2). These projects include a variety of improvements which, in conjunction with TIP Project Number R-2707, will improve traffic movement within and around Shelby.

1.4.2 1994 Shelby Thoroughfare Plan

The most recent version of the City of Shelby Thoroughfare Plan was formally adopted on November 4, 1994. The plan identifies both existing and proposed roadway facilities which are of importance to the circulation of traffic in the vicinity of Shelby (see Exhibit 1-2). The proposed improvement of the US 74 corridor, shown on the plan as a northern bypass of the City of Shelby, would provide for local travel north of town as well as for through traffic on US 74. Four segments of new location roadway are identified in the plan which, in conjunction with existing area roads, would form a continuous loop road around the southern portion of town.

- Poplar Springs Church Road to Linda Barnett Sr. Drive.
- Extension of James Love School Road to Pleasant Drive.
- Extension of Pleasant Drive to Caleb Road.
- Extension of Caleb Road to US 74 Shelby Bypass.

This loop would intersect the northern bypass of Shelby both to the west and to the east of the city.

Three additional segments shown on the plan would provide increased continuity for north-south traffic movements within Shelby:

- Extension of Charles Road to Lafayette Street.
- Extension of DeKalb Street to College Avenue (NCDOT TIP Project Number R-519; note: this project was completed in June 1995).
- Extension of Sulfur Springs Road to Kings Road.

1.5 CAPACITY

1.5.1 Characteristics of the Existing Facility

Existing US 74 is classified as an Urban Principal Arterial in the Statewide Functional Classification System, and is also a part of the National Highway System. It consists primarily of a four-lane facility divided by a grass median which varies in width from 26 feet to 40 feet. Pavement width is 24 feet in each direction; unpaved shoulders range from 8 to 12 feet in width. Right-of-way width varies from 150 to 200 feet, with partial control of access. Due to the predominant retail and commercial land uses along existing US 74, a continuous two-lane frontage road extends along each side of the highway for approximately one-third of its length through Shelby. These service roads have access points to US 74 spaced approximately every 0.1 mile.

Existing US 74 cuts through rolling terrain, with grades ranging predominantly from approximately two to six percent. Sight distance along the highway is substandard in several areas along the corridor (i.e., not in accordance with 2001 American Association of State Highway and Transportation Officials (AASHTO) standard highway specifications). Horizontal alignment includes curves which generally meet AASHTO standards, with a few exceptions.

The posted speed limit along existing US 74 is 45 miles per hour (mph) between Hamrick Street and NC 226; and 55 mph along other portions of the highway.

1.5.2 Existing (Year 1994) Traffic Volumes

Existing (1994) average daily traffic (ADT) volumes on US 74 are shown in Exhibit 1-3 (note: the use of 1994 as the existing traffic year dates from the publication of the DEIS). As can be seen in the exhibit, traffic volumes range between 20,000 to 25,040 vehicles per day along the

portion of US 74 between the US 74 Business termini; and between 13,300 and 25,000 vehicles per day on portions of US 74 outside of the US 74 Business termini.

1.5.3 Existing (Year 1994) Levels of Service

Existing and future traffic operations are expressed in terms of level of service (LOS). Level of service provides a measure of driver comfort based on delay and maneuverability in a driving situation. This method assigns a letter ranking from A, representing the highest level of comfort, to F, representing the lowest level, to each link or intersection. Levels of service E and F represent operations at or near capacity and breakdown conditions, respectively. These levels are defined in more detail in Table 1-3. This ranking system generally takes into consideration various physical roadway characteristics such as lane width, roadway topography, roadside obstructions and other geometric factors. Policy set by AASHTO recommends that rural freeways be designed to level of service B, and urban freeways be designed to level of service C; in some cases, such as large urban areas, it is necessary to design new facilities to level of service D. NCDOT strives to design highways to operate at a minimum level of service C in peak periods.

Existing levels of service at US 74 intersections are shown in Exhibit 1-3. The SR 1313 intersection, the US 74 Bypass/US 74 Business intersection east of Shelby, and the NC 150/18 interchange all operate at LOS B. Levels of service of the remaining intersections range from LOS C to E.

**Table 1-3
LEVEL OF SERVICE DEFINITIONS**

Level of Service	Signalized Intersection	Unsignalized Intersection	Rural Roadway
A	Uncongested operations, all queues clear in a single-signal cycle. Delay < 10.0 seconds (sec)	Little or no delay. Delay < 10 sec/vehicle	Completely free flow.
B	Uncongested operations, all queues clear in a single cycle. Delay > 10.0 sec and < 20.0 sec	Short traffic delays. Delay > 10 sec/vehicle and < 15 sec/vehicle	Free flow, presence of other vehicles noticeable.
C	Light congestion, occasional backups on critical approaches. Delay > 20.0 sec and < 35.0 sec	Average traffic delays. Delay > 15 sec/vehicle and < 25 sec/vehicle	Ability to maneuver and select operating speed affected.
D	Significant congestions of critical approaches but intersection functional. Cars required to wait through more than one cycle during short peaks. No long queues formed. Delay > 35.0 sec and < 55.0 sec	Long traffic delays. Delay > 25 sec/vehicle and < 35 sec/vehicle	Unstable flow, speeds and ability to maneuver restricted.
E	Severe congestion with some long standing queues on critical approaches. Blockage of intersection may occur if traffic signal does not provide for protected turning movements. Traffic queue may block nearby intersection(s) upstream of critical approach(es). Delay > 55.0 sec and < 80.0 sec	Very long traffic delays, failure, extreme congestion. Delay > 35 sec/vehicle and < 50 sec/vehicle	At or near capacity, flow quite unstable.
F	Total breakdown, stop-and-go operation. Delay > 80.0 sec	Intersection blocked by external causes. Delay > 50 sec/vehicle	Forced flow, breakdown.

Sources: 2000 Highway Capacity Manual, Transportation Research Board Special Report 209.

1.5.4 Year 2020 Traffic Volumes

(Note: Use of 2020 as the future traffic year dates from the publication of the DEIS [similar to the use of 1994 as the existing traffic year]. Traffic was updated for the Preferred Alternative, discussed in Chapter 2 of this document.)

A traffic model representing the project study area was developed in order to estimate future traffic conditions and to estimate the effects of various roadway configurations. A model primarily consists of a computerized representation of the physical roadways in the project area along with a trip table. The trip table represents the number of cars traveling from one area or "zone" of the project corridor to another zone. The estimation of future traffic entails modifying

the roadway configuration to incorporate any possible or planned roadway improvements as well as altering the trip table to reflect any changes in travel patterns between zones in the study area.

Future traffic projections were developed by applying growth factors to the 1994 trip table. These factors are based on socioeconomic characteristics of the study area and region such as population, households, and employment. The resulting trip table traffic volumes were then assigned to the various links of the future roadway network.

Average daily traffic volumes on existing US 74 in the year 2020 are estimated to range between 32,800 and 62,000 vehicles per day without a bypass of the City of Shelby (see Exhibit 1-4).

1.5.5 Year 2020 Levels of Service

The No Build alternative assumes that in the year 2020, the existing transportation system would evolve as currently planned in the NCDOT State Transportation Improvement Program and other regional and local transportation plans, but without improvement of existing US 74 or the construction of a US 74 Bypass of Shelby. It assumes future typical sections on existing US 74 similar to current typical sections, including partial control of access between the eastern terminus of US 74 Business and SR 1001, and no control of access over the remainder of the facility. Levels of service for the No Build alternative for all intersections and the NC 150/18 interchange would be LOS F (see Exhibit 1-4), indicating breakdown conditions essentially along the entire length of the project.

1.5.6 Accident Analysis

There are several criteria by which to measure the relative safeness of a roadway segment. These criteria are based on traffic accident statistics for the facility, and may be compared with average statistics encompassing a large group of similar facilities.

For the analyses in this section, all reported accidents on existing US 74 from 0.3 mile west of SR 1162 to SR 1001 for the period January 1, 2000 to December 31, 2002 were examined. North Carolina statewide crash rates for US routes from 2000 through 2002 were used for comparison. Individual US 74 highway segments were designated "urban" or "rural" based on their speed and relative concentration of traffic generators. Since many factors associated with accident occurrence (e.g., speed limit, highway access, concentration of residential driveway connections, existence of traffic signals) vary considerably between urban and rural areas, existing US 74 (i.e., the segment between the western and eastern US 74 Business termini) was compared with statewide urban rates only.

Accident Rate. This measure, related to average daily traffic and length of facility, is expressed in terms of 100 million vehicle-miles (mvm), traveled by all vehicles using the facility over a given period of time. The statewide rates used for comparison take into account some geometric features of the facility, such as number of lanes and the type of access control.

Table 1-4 indicates the total and fatal crash rates for the subject US 74 section, along with corresponding 2000-2002 statewide crash rates. The crash rates on the section of US 74 from 0.3 mile west of SR 1162 to US 74 Business were higher than the statewide crash rates in all categories.

**Table 1-4
CRASH RATES ON EXISTING US 74 IN THE STUDY AREA**

Segment (1)	Roadway Typical Section (2)	ADT (3)	Length (miles)	ACCIDENTS		TOTAL RATE 100 mvm		FATAL RATE 100 mvm	
				Total	Fatal	US 74 (4)	Statewide (5)	US 74 (4)	Statewide (5)
US 74 from 0.3 mile west of SR 1162 to US 74 Business	4-lane divided rural (6)	21,900	6.18	208	2	140.2*	131.8	1.35*	1.25
Existing US 74 Bypass	4-lane divided urban (6)	35,000	5.64	482	1	222.8	432.4	0.46	1.23
US 74 from US 74 Business to SR 1001	4-lane divided rural (6)	30,600	4.49	169	0	112.23*	83.22	0.00	1.11

* US 74 rate exceeds statewide rate.

- (1) Segments listed in order from west to east.
- (2) "Roadway Typical Section" reflects conditions during the accident analysis period.
- (3) Average Daily Traffic figures supplied in NCDOT accident reports.
- (4) NCDOT Traffic Accident Reports for US 74 for 1/1/00 through 12/31/02.
- (5) NCDOT "Crash Rates for 2000-2002 by Road System, Type and Control".
- (6) Partial control of access.

Accident Severity Index. The severity index is a weighted measure of the degree of injury and property damage incurred in traffic accidents on a given roadway segment. Fatal injuries are designated "F". Non-fatal injuries are designated "A", "B", or "C"; "A" represents the most severe injuries and "C" the least severe.

An accident resulting in injuries to more than one person is classified according to the most severe injury incurred. Accident severity is then evaluated with the following expression:

$$\text{Accident Severity Index} = \frac{[76.8 \times (\text{total "F" and "A" accidents}) + 8.4 \times (\text{total "B" and "C" accidents}) + (\text{Property Damage Only accidents})]}{\text{total number of accidents}}$$

Both urban and rural sections of US 74 experienced accidents which were typically less severe than their statewide counterparts, as shown in Table 1-5. The severity index for the urban US 74 Bypass segment was the closest to the statewide index, which could be attributed to degree of development and numerous access points along the bypass portion.

Table 1-5

2000-2002 ACCIDENT SEVERITY INDEX FOR EXISTING US 74 IN THE STUDY AREA

Segment	Roadway Typical Section	Roadway Type	NUMBER OF ACCIDENTS (1)						ACCIDENT SEVERITY INDEX	
			F	A	B	C	PDO	Total	US 74	Statewide (2)
US 74 from 0.3 mile west of SR 1162 to US 74 Business	4-lane divided Partial control of access	Rural	2	3	17	54	132	208	5.35	7.05
Existing US 74 Bypass	4-lane divided Partial control of access	Urban	1	5	32	135	309	482	4.51	4.67
US 74 from US 74 Business to SR 1001	4-lane divided Partial control of access	Rural	0	5	19	41	104	169	5.87	7.05

(1) NCDOT Traffic Accident Reports for US 74 for 1/1/00 through 12/31/02.

(2) NCDOT "Crash Rates for 2000-2002 by Road System, Type and Control".

Accidents by Type. It is helpful to investigate the types of accidents occurring on a particular highway. The recurrence of one or more particular categories of accidents at a site may point to some deficiency in the design or capacity of the facility that may be contributing to such occurrences, although other factors (e.g., obstruction of sight distance by roadside vegetation) may contribute as well.

Nearly three-quarters of the reported accidents occurring on the rural roadway sections were distributed between "rear end," "angle," and "ran off road" accident types, as displayed in Table 1-6. As rural roads generally have lower traffic volumes with fewer turning vehicles and stops than urban roads, the relatively high numbers of accidents in these three categories may be due to a combination of high speeds and lack of access control. The fact that 53 percent of the reported rural accidents resulted in injury (compared with 43 percent in the urban area) suggests that high speeds were frequently involved. Other factors potentially contributing to "ran off road" accidents would be poor sight distance and inadequate definition of pavement edges (e.g., poor pavement markings and/or lack of roadside reflectors on curves).

The area designated urban accounted for approximately one-third of the 16.2-mile project length, and about two-thirds of the reported accidents for the period studied. Because urban accidents tended to be clustered at or near intersections, the four urban intersection areas with the greatest numbers of accidents were chosen for closer examination. The intersection study locations represent approximately six percent of the total US 74 project length (17 percent of the urban length), contained 52 percent of the reported urban accidents. Table 1-7 shows the emerging pattern of accident types. "Rear end" accidents were most prominent, representing anywhere from 35 to 74 percent of the total accidents at each of the sample intersections. Other common

types were "angle" accidents (5 to 35 percent); "left turn" accidents (3 to 18 percent); "sideswipe" accidents (4 to 8 percent); and "ran off road" accidents (2 to 9 percent).

Table 1-6

US 74 ACCIDENT BREAKDOWN BY MAJOR ACCIDENT TYPES

Location	Reported Accidents	Rear End (2)		Angle		Ran Off Road (3)		Left Turn (4)		Sideswipe (5)		Animal		Total (Types)
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
US 74 Rural Sections	377	154	41%	43	11%	16	4%	24	6%	38	10%	23	6%	298
US 74 Urban Sections	482	297	62%	64	13%	11	2%	17	4%	54	11%	1	0%	444
Total All Sections	859	451	53%	107	12%	27	3%	41	5%	92	11%	24	3%	742
High-Accident Urban Intersections (1)														
Hamrick	16	7	44%	3	19%	1	6%	0	0%	3	19%	0	0%	14
NC 150/DeKalb	38	15	39%	10	26%	1	3%	1	3%	7	18%	0	0%	34
NC 226 East	40	25	63%	5	13%	1	3%	3	8%	5	13%	0	0%	39
NC 180	38	16	42%	8	21%	1	3%	4	11%	2	5%	0	0%	31
TOTAL: High-Accident Urban Intersections	132	63	48%	26	20%	4	3%	8	6%	17	13%	0	0%	118

(1) For urban intersections with highest numbers of accidents in order from west to east.

(2) Combines rear end slow or stop and rear end turn accidents.

(3) Combines ran off road left and ran off road right accidents.

(4) Combines left turn same road and left turn cross traffic accidents.

(5) Combines sideswipe same direction and sideswipe opposite direction accidents.

Source: Total accidents were taken from NCDOT Traffic Accident Reports for US 74, 1/1/00 through 12/31/02.

Table 1-7

2000-2002 ACCIDENT SUMMARY FOR US 74 IN THE STUDY AREA

Accident Type	Total Accidents	Percent of Total	Potential Mitigation Under Bypass Alternative *	Potential Mitigation under Upgrade Alternative
Angle	107	12.5%	✓	✓
Animal	24	2.8%		✓
Backing Up	8	0.9%		
Bicycle	4	0.5%		✓
Fixed Object	51	5.9%		✓
Head On	6	0.7%		✓
Jackknife	3	0.3%		
Left Turn - cross traffic	14	1.6%	✓	✓
Left Turn - same road	27	3.1%	✓	✓
No Collision - Other	6	0.7%		
No Collision - Overturn	7	0.8%		
Other Collision w / vehicle	5	0.6%		
Other Object	5	0.6%		
Parked Vehicles	4	0.5%		✓
Pedestrian	1	0.1%		✓
Ran off Road - Straight	1	0.1%		
Ran off Road - Left	14	1.6%		✓
Ran off Road - Right	13	1.5%		✓
Rear-End, slow or stop	442	51.5%	✓	✓
Rear-End, turn	9	1.0%	✓	✓
Right Turn - cross traffic	8	0.9%	✓	✓
Right Turn - same road	6	0.7%	✓	✓
Sideswipe - opposite	8	0.9%		✓
Sideswipe - same	84	9.8%		✓
Unknown	2	0.2%		
TOTAL	859	100.0%		

* Reflects potential reductions in accidents on the existing US 74 facility.

Source: Total accidents were taken from NCDOT Traffic Accident Reports for US 74 for 1/1/00 through 12/31/02.

This suggests that the existing US 74 Bypass, a growing business corridor, has problems associated with capacity and access control. "Rear end" accidents often result when through traffic must navigate around turning or slowing vehicles traveling in the same direction, and may indicate that turning volumes exceed road capacity, or that speed fluctuations defy driver expectation. "Angle" accidents and "left turn" accidents can be exacerbated by lack of signalization, high total intersection volumes, and the presence of multiple cross streets; "left turn" accidents may occur when signalized intersections lack left turn phases. Both "sideswipe" and "ran off road" type accidents can result when roadway design, delineation, or channelization is deficient.

1.6 MODAL INTERRELATIONSHIPS

These modes are discussed in greater detail in Section 3.1.3 (Transportation Planning).

1.6.1 Airports

There is one main airport within the study area, the Shelby Municipal Airport southwest of town on NC 150. Although neither a northern bypass nor an upgrade of existing US 74 would provide direct access to the facility, either of these options could bring about increased usage of this facility through encouragement of industrial and commercial growth near Shelby.

Access to the Charlotte-Douglas International Airport, on the west side of Charlotte near US 29-US 74, would be improved by the construction of a controlled access US 74 highway. Airport patrons approaching from Shelby and points west would benefit from the improved facility.

1.6.2 Rail Service

Existing rail service in and near the project area is provided by CSX Transportation and the Norfolk Southern Railroad. The proximity of a major east-west controlled access highway facility, which would improve distribution of goods in the region, could promote an increase in freight service.

1.6.3 Ports

The deep-water Port of Wilmington is accessed by US 74. In conjunction with the other proposed accelerated and US 74 Intrastate Corridor TIP projects (see Section 1.4.1), a controlled access freeway would improve travel to this port. The existence of a four-lane freeway connection which would expedite the transportation of goods to the port could encourage the development of certain types of industries in the vicinity of Shelby which would benefit from shipping access.

1.7 SUMMARY OF PROJECT PURPOSE AND NEED

The proposed improvement of the US 74 corridor through Shelby (TIP Project Number R-2707) is of vital importance to the local region and the State of North Carolina. The NCDOT proposes to construct the US 74 project to increase the capacity of the US 74 corridor, thereby improving levels of service, reducing the potential for future traffic congestion, and improving safety. Future traffic projections indicate that in the absence of improvements to the subject section of US 74, traffic conditions on this highway would become unacceptably congested and increasingly unsafe; traffic delays on the existing facility would continue to mount, as would the accident rates, some of which already exceed statewide rates for like facilities.

An important secondary purpose of the project would be to strengthen the economy of the area through the provision of a more efficient corridor for commuters, commercial traffic, and other local and regional users. Increased mobility would lower operating costs for businesses relying on US 74 for the transport of goods and services, allowing the businesses to grow and thereby expand options for employment and place of residence for many commuters by lowering travel times; and enhance the use of other modes of transportation.